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End Semester Examinations-2025
BSc. Hons. Chemistry (FYUP), Chemistry/Semester-I
Paper Title: Basics of Inorganic Chemistry
Paper Code: BCH-DSC101

Time: 2 ½ hours

Maximum Marks: 60

Abbreviations Used: CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create.

Q. No.		BTL	CLO	PLO
SECTION A				
Very Short Type Questions (Attempt all):		(1x15=15 marks)		
A1	Write equation for theoretical calculation of Lattice Energy	2-3	2	1-2
A2	How do the metallic and non-metallic characters vary across the period in the periodic table.	2	2	1-2
A3	Write similar reactions of pseudo halogens and halogens	1	2	2
A4	An element X belong to the third period of P block element. It has 4 electrons in the outermost shell. Name the element	2-3	2	3
A5	Draw the MO Diagram of CO molecule	1-2-3	1-2	1-2
A6	Why Na ⁺ has higher ionization enthalpy than Ne	2	3	3
A7	Complete the following reaction $P_4 + 3 NaOH + 3 H_2O \rightarrow$	1	2	2
A8	Write electronic configuraion of fourth element of Group 18	1	2	3
A9	Define variable covalency with example	1-2	1-2	1-2
A10	Justify amphoteric nature of water by the chemical reactions	2	2-3	2-3
A11	Show thermal decomposition of alkaline earth metal carbonate	1	1-2	1-2
A12	Define Fajan's Rule.	2	2-3	3
A13	Give reaction to show hydrolysis of Silicon Tetra chloride	1-2	3	2-3
A14	Write anomalous behaviour of Flourine.	2	1-2	1-2
A15	Write uses of Fullurenes	1	1-2	2
SECTION B				
Long Type Questions (Attempt any two out of four):		(10x2=20 marks)		
B1	A) Consider species in which central atom has i. 3 bond pairs and 2 lone pairs ii. 2 bond pairs and 3 lone pairs show the hybridization and geometry of these species B) Name the peroxo acids of Sulphur.Discuss their structure and give the oxidation state of 'S' in them.	3-6	1-3	1-3

B2	A) Use the molecular orbital energy level diagram to show that O ₂ would be expected to have a double bond; F ₂ a single bond and Ne ₂ no bond. B) What is the % ionic character of HBr when the dipole moment of HBr is 1.6×10^{-30} cm and inter-atomic spacing is 1 Å	3-6	2-6	4-6
B3	A) Arrange the following in increasing order of acidic strength by giving reasons. HClO ₄ , HClO ₂ , HClO ₃ , HOCl B) Explain giving suitable reasons i. H ₂ O is a liquid whereas H ₂ S is a gas. ii. Inter-halogen compounds are more reactive than Halogens.	3-4	3-5	3-5
B4	A) Discuss the structure and bonding in borazine. Give the similarities and differences between borazine and benzene, with suitable examples. B) On reaction with air, Li predominantly forms monoxide, Na forms peroxide and other alkali metal forms superoxides. Give the balanced chemical reactions.	1,4-5	3-6	3-6

SECTION C

Short Type Questions (Attempt all Questions):		(5x5=25 marks)		
C1	Compare the structure and properties of Graphite and Diamond OR BeSO ₄ is soluble but BaSO ₄ is insoluble in water. Explain	2-4	4-5	4-5
C2	What is diagonal relationship? Explain taking examples of Beryllium and Aluminium. OR Write the preparation, properties and uses of Red Phosphorus	1-3	4	3-4
C3	Discuss the thermal stability of hydrides of Group 17 elements. Write uses of halogens. OR Discuss the reducing property of alkali metals	4-6	4	4-5
C4	What are silicones? How can you prepare linear and cross-linked silicones? OR Discuss the structure and properties of Diborane	3-4	2-3	3-5
C5	What is the effect of back bonding in the acidity of Boron trihalides OR The bond angles of CH ₄ , NH ₃ , and H ₂ O are 109.5°, 107°, and 104.5° respectively, although the central atom is sp ³ hybrid. Explain	5-6	3-6	4-6